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REMARKS

The Applicant also wishes to thank the Examiner for the courtesies extended during the Telephonic Interview between the Examiner and Kenneth Green on May 1, 2003.

10 **1. Present Disposition of the Claims.**

Applicant believes that the claims were allowable as originally filed. However, in order to more particularly point out and distinctly claim Applicant's invention, marked-up versions of Claims 1, 5, and 10 are herein submitted along with the remainder of the pending claims.

15 Applicant believes that no new matter has been added.

Specifically, Claim 1 is amended to explicitly recite that the steps are performed in the order listed. Such order is recited in the original specification in paragraph 0012, and does not constitute new matter.

20 Claim 5 is amended to recite that the step of providing a substrate is explicitly ordered as the first step, and the step of implanting the source/drain extension is explicitly ordered as the second step.

25 Claim 10 is amended to recite "performing an approximately vertical source/drain extension implant in a region from the isolation trench to the gate, to a depth of approximately 10 nm to approximately 30 nm," which amendment is supported by the original specification and shown in Figure 1 of the original drawings.

2. Rejection of Claims 1-6 and 8-11 under 35 U.S.C. § 103(a).

30 In the Final Office Action mailed January 28, 2003, the Examiner rejected Claims 1-6 and 8-11 under 35 U.S.C. § 103(a) as being unpatentable over Pan (U.S. Patent No. 5,595,919) in view of Wu (U.S. Patent No. 6,190,977). The Examiner stated that Pan discloses the steps of:

35 providing a gate oxide and gate;
performing a source/drain extension implant (30, fig. 9);
forming spacer on the gate (22, fig. 3);
removing the spacer (fig. 7); and
performing a halo implant (34, fig. 11) (col. 2, ln. 59 - col. 3, ln. 54).

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and that Wu discloses:

10 a gate defining the channel region of no more than 50 nm length;
performing epitaxy to form raised source/drain regions;
and forming a silicide on the gate and source/drain regions.

The Examiner also stated that:

15 it would have been obvious for one of ordinary skill in the art at the time of the invention to combine Wu with Pan, because the raised source and drain suppresses the short channel effect and protects a substrate from further processing steps.

The Examiner further stated that:

20 Pan and Wu disclose the claimed invention except for the implant depth of either the source/drain extension or the halo. However it would have been obvious to one skilled in the art at the time of the invention was made to implant dopants at the claimed ranges of depth

25 As argued in the response filed March 28, 2003, the lightly doped source and drain (LDD) region 30 of Pan is not equivalent to the source/drain extension 11 of the present invention, and the methods taught in Pan to form the LDD 30 cannot result in a structure equivalent to the source/drain extension 11 taught in Claims 1, 5, and 10 (all of the independent claims) of the present invention. The steps taught in Pan to form the LDD 30 cannot form the source/drain extension 11 because the source/drain extension 11 would have to be formed *before* the oxide layer 26, and the LDD 30 of Pan is formed *after* forming the oxide layer 26, therefore the step of forming the source/drain extension 11 of the present invention is not taught, suggested, or motivated by Pan.

30 The Examiner relies upon Wu to define a channel region of no more than 50 nm, citing col. 1, lns. 54-76. However, in the cited text, Wu only describes the need for "shorter channels."
35 Applicant respectfully traverses the Examiner's reliance upon Wu to teach 50 nm length channels because Wu fails to provide either enablement or dimensions for short channels.

The Examiner's arguments that the source/drain extension depth is obvious contradicts Wu, which states in column 1, line 66 to column 2, line 1 that:

40 For developing future MOSFET devices with a sub-micrometer or even smaller feature size, the **ultra shallow junctions are required** to suppress the short channel effects encountered with the down scaling sizes.

5 Thus, Wu not only fails to teach a shallow source/drain region, but clearly teaches *away* from the source/drain junction 11 taught by the present invention, which is not an ultra shallow source/drain region, thereby rebutting the Examiner's argument that the depth taught by the present invention was obvious.

10 Because the grounds for rejection of the independent claims have been addressed, the Applicant believes that all of the claims (Claims 1-6 and 8-11) are in condition for allowance. Accordingly, the Applicant respectfully requests that the Examiner withdraw the rejections of these claims, and passage of the present application to issuance is solicited.

15 **3. The Advisory Action.**

 The Applicant wishes to thank the Examiner for his consideration of the response filed March 28, 2003. In the Advisory Action mailed April 22, 2003, the Examiner stated that:

20 The request for reconsideration has been considered but does NOT place the application in condition for allowance because the way the claims are written does not preclude the halo region to be formed before the raised source and drain.

 The currently amended independent claims either explicitly recite the order of steps up to and including forming the source/drain region 11 (currently amended Claims 1 and 5), or particularly limit the step directed to forming the source/drain region 11 (currently amended Claim 10) to achieve the same result as achieved by ordering the steps up to and including the step of forming the source/drain region 11. As such, the Applicant believes that Claims 1, 5, and 10 are in condition for allowance, and the remaining claims, all of which depend from Claims 1, 5, or 10, are therefore also in condition for allowance. Accordingly, the Applicant respectfully requests that the Examiner withdraw the rejections of these claims, and passage of the present application to issuance is solicited.

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CONCLUSION

Claims 1, 5, and 10 have been amended to better encompass the full scope and breadth of the present invention, notwithstanding the Applicant's belief that the claims were allowable prior to the present amendment. Applicant respectfully submits that the presently claimed invention is patentably distinct over the cited references; and Applicant therefore believes that the pending claims are non-obvious in view of Pan et al., even in view of Wu, as required by 35 U.S.C. 103. Therefore, Applicant believes the present invention is patentable as claimed. In view of the foregoing preliminary amendment and remarks, favorable consideration by the Examiner, withdrawal of the present rejections, allowance of the pending claims, and passage of the present application to issuance are accordingly solicited. *The Examiner is cordially invited to telephone the undersigned for any reason which would advance the pending claims toward allowance.*

Respectfully submitted,



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